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Inclusive Teaching and Learning in Higher Education: An Evaluation of The Impact of Faculty Development Programmes

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Abstract

This paper evaluates the impact of a faculty development (FD) programme implemented in an Italian university during the 2022/2023 academic year. The programme consisted of a series of lectures and workshops focused on the implementation of innovative and inclusive teaching practices for university professors and secondary school teaching staff. The initiatives covered a wide spectrum of topics, including educational tools to address learning barriers, innovative and inclusive teaching methodologies, interactivity enhancement, and the use of digital technologies in teaching. To assess the impact of the training sessions on university professors, the evaluation model proposed by Kirkpatrick was employed. Kirkpatrick's model is an internationally recognized tool that provides a conceptual framework for analysing the results of educational, training and learning programmes, focusing on four levels of evaluation: Reaction, Learning, Behaviour, and Results. In line with the reference literature, we evaluated the impact of training sessions on the basis of a questionnaire that was submitted to all participants of training events and that was explicitly aimed at reproducing the four levels of evaluation of Kirkpatrick's model. The questionnaire included a plurality of indicators that were then aggregated into the four levels creating distinct variables of high internal consistency (as detected by their respective Cronbach's alpha). Our results show a positive impact of training on university teachers for all four levels of evaluation. More specifically, the highest values arise for the first and second levels of evaluation (Reaction and Learning), while lower values arise for the third and fourth levels (Behaviour and Results). Different effects also emerge according to the career stage of the participants (young researchers, associate professors, full professors) and changes in adopted teaching methodologies arise between pre and post training activities.

Keywords: inclusive teaching, faculty development, teacher training**,** innovative teaching methods, higher education

1. Introduction

Faculty Development (FD) evaluation plays a pivotal role in the optimization of institutional resources and the enhancement of educational quality (Sorcinelli, 2020), being a fundamental mechanism to ensure that faculty members receive the necessary support to provide students with a high-quality education. The evaluation of faculty development programmes, and in particular those with the goal of promoting inclusive teaching and learning environments, is indeed not only essential for the benefit of students, professors, and academic institutions, but also represents a critical stride toward the global commitment to address the educational challenges faced by society expressed by Sustainable Development Goal 4 (United Nations, 2015): "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". Inclusive education indeed is, at its core, a commitment to providing equitable learning opportunities for every individual, regardless of their background, abilities, or unique learning needs: it is a moral imperative as well as a fundamental instrument to create sustainable and peaceful societies (Castillo-Montoya et al., 2023).[1]

One of the central challenges of FD is the effective transfer of acquired knowledge to the workplace. A successful FD programme is characterised by its ability to foster a specific blend of knowledge, attitudes, and behaviours, thereby ensuring their application and sustained practice over time. The goal of FD evaluation is to assess the existence and strength of these channels.

Historically, a significant portion of FD evaluations has predominantly focused on participants' satisfaction with the programmes rather than delving into measurable behaviour changes or assessing return on investment. This limited scope, which mainly relies on easily quantifiable metrics, such as the number of workshops and participants, and immediate assessments like participant reactions, can potentially restrict the depth and efficacy of a comprehensive FD evaluation. To overcome these limitations, an effective FD evaluation should encompass broader aspects, including knowledge retention (i.e. the process of absorbing and retaining information and transferring it from short-term to long-term memory) and knowledge transfer to the workplace, which may entail the adoption of new teaching methods. More in general, the task of assessing the effects of FD programmes is notably complicated, often due to the multitude of variables that need to be considered, such as the programme's duration, geographical context, and instructional methodology and style.

[1] In exploring the knowledge and beliefs of faculty members about inclusive education, **Márquez and Melero-Aguilar (2022)** find that inclusive education is a term unknown or misunderstood by many faculty members, recommending continuous training and shared debate to promote the meaning and implication of inclusive education in higher education.

In this paper, we propose an evaluation of the impact of Faculty Development (FD) initiatives carried out in a Northern Italian university - the University of Modena and Reggio Emilia (Unimore) - during the 2022/2023 academic year. The goal of these initiatives was to equip participants with the knowledge and skills necessary for the creation of inclusive and innovative learning environments, replying to the diverse needs of all students, in line with the global commitment proposed by SDG4 and the key role of inclusive learning environments in higher education institutions. These activities comprised a series of seminars and workshops that spanned a wide spectrum of topics: educational tools aimed at addressing learning barriers, the exploration of innovative and inclusive teaching methodologies, techniques for enhancing interactivity in the classroom, and the utilisation of digital technologies in teaching.

The case analysed is of interest, since Faculty Development is currently under construction in the chosen University and considering the adoption of new rules by the national agency for quality assessment that also include teacher training in Italy.[2]

Our main research questions are the following: What was the overall impact of Unimore faculty development initiatives on participants? Did they appreciate the seminars/workshops? Did they learn something new about inclusive and innovative teaching practices? Did they change their behaviour/mindset after the training sessions? Were there any effects of the faculty development initiatives on the workplace?

The evaluation framework we adopted is Kirkpatrick's evaluation model, an internationally recognized tool that provides a conceptual framework for analysing the results of educational, training and learning programmes (**Kirkpatrick, 1959, 1998, Kirkpatrick and Kirkpatrick 2016**). Although the model was developed in the 1950s, it is still widely used today and is one of the landmark models in training evaluation.

In line with the Kirkpatrick model, we structured our analysis into four different levels of evaluation criteria: Reaction (i.e. participants' satisfaction with the FD activities), Learning (i.e. participants' increase in knowledge about the topics included in the FD activities), Behaviour (i.e. participants' change in behaviour in teaching practices) and Results (i.e. the effect of training on the university institution). Our findings show a positive impact of training on university teachers for all four levels of evaluation. More specifically, higher scores resulted for the first and second levels of evaluation (Reaction and Learning), while lower scores resulted for the third and fourth levels (Behaviour and Results). Moreover, different results emerged according to the career stage of the participants (young researchers, associate professors, full professors) and changes in adopted teaching methodologies arose between pre and post training activities.

[2] https://www.anvur.it/wp-content/uploads/2023/02/AVA3_LG_Autovalutazione_Valutazione_2023_01_12.pdf

The paper is structured as follows. Section 2 is dedicated to a review of literature, Section 3 briefly illustrates the faculty development initiatives which are the object of our evaluation, Section 4 introduces our methodology, Section 5 presents our data and identification strategy, Section 6 illustrates our results, and Section 7 reports our conclusions. The Appendix is dedicated to some further summary statistics.

2. Literature review

The scientific literature on faculty development emerged in the mid-20th century, with a focus on improving teaching and learning in higher education. In the late 20th century, the scope expanded to include broader aspects of faculty roles, incorporating research skills, leadership development, and professional growth. Later on, the literature began to emphasize evidence-based practices, technological integration, and addressing issues of diversity and inclusion. Contemporary research continues to explore innovative strategies to enhance faculty effectiveness in response to the evolving needs of academia.

Phuong et al. (2020) conduct a systematic analysis of review studies on faculty development published in the last two decades, discussing their implications and limitations and identifying significant gaps and challenges, including the absence of a clear and consistent definition, the diversity and complexity of activities, outcomes, and contexts and the scarcity of empirical evidence on effectiveness. **Beach et al.'s (2016)** comprehensive book synthetizes faculty development research and presents a conceptual model and principles for effective faculty development, discussing challenges and opportunities across teaching, research, leadership, and diversity, as well as emphasizing the vital role of faculty development in higher education improvement. The challenges and opportunities that educational development faces in the context of higher education were also addressed by **Gibbs (2013)** and **Amundsen and Wilson (2012**): while the former focuses on quality assurance, accountability, diversity, and technology, the latter proposes a framework of six foci of practice (skill, method, reflection, disciplinary, institutional, and action research or inquiry) for the design and evaluation of educational development activities.[3] Adopting a broader perspective, **Wright (2017)** addresses the question of defining what matters in faculty development and argues that faculty development should focus on the core values and purposes of higher education such as academic freedom, diversity, democracy, and social justice. The central challenge of faculty development represented by the effective transfer of acquired knowledge to the academic staff,

[3] Additional contributions can be found in **Levinson-Rose and Menges (1981), Hines (2009), Schroeder (2010)** and **Fernández Díaz et al. (2010).**

improving teaching and learning environment and placing students in an active and interactive position, is highlighted by **Lotti and Lampugnani (2020)** and **Lotti et al. (2021)**.

A related strand of the scientific literature on faculty development is centered on faculty development evaluation, which plays a crucial role in assessing the effectiveness, impact, and alignment of faculty development programmes with institutional goals and educational outcomes.

The seminal work by **Kirkpatrick (1959)** introduces a four-level evaluation framework (reaction, learning, behavior and results) which is still widely used and provides a structured approach to assess both the short-term and long-term impacts of faculty development programmes. Kirkpatrick's evaluation model was successively specified in **Kirkpatrick (1998)** and more recently reformulated in **Kirkpatrick and Kirkpatrick (2016),** who update the classic model to the New World Kirkpatrick Model, maintaining the four evaluation levels and adding new elements to help people and organizations to operationalize it effectively.

Additional studies on frameworks for faculty development evaluation include: **Kreber and Brook (2001)**, who introduce a four-dimensional framework (individual, institutional, disciplinary, and societal) for impact evaluation, underscoring the need for a comprehensive assessment approach; **Patton (2008)**, who prioritizes stakeholder engagement, in an effort to bring forth the concept of utilization-focused evaluation; **Kucsera and Svinicki (2010)**, who review the literature on the evaluation of faculty development programs focusing on the rigor and validity of the evaluation methods and highlighting the need for a robust and systematic approach to assess faculty development initiatives; **Chalmers and Gardiner (2015),** who propose an evaluation framework for academic teacher development programs with an emphasis on accountability and policy impact; **Hurney et al. (2016)**, who introduce a framework for assessing faculty learning outcomes that underscores backward design and alignment, thereby illustrating the cyclical nature of assessment within educational and faculty development. With a specific focus on teaching and learning centers, **Kolomitro and Anstey (2017)** add to the discussion a survey on the evaluation practices, addressing the need for collaboration and the dissemination of best practices. Based on a qualitative content analysis on interviews to Finnish university teachers, **Myllykoski-Laine et al. (2023)** highlight the perceived importance of collegiality in FD for teaching development.

Within the literature on faculty development evaluation, a special focus has been given to the impact of faculty development on teaching practices and student learning outcomes. **Camblin and Steger (2000)** find that faculty development programmes offer both anticipated results (e.g., upgraded skills and increased use of technology) and unexpected results (e.g., cooperation among faculty from diverse disciplines and multiplier effects on scope and nature of the projects), also showing that they change the way interdisciplinary faculty collaborate. Using pre-post-test design methods, **Findeisen**

et al. (2010) demonstrate that professors' training modules positively influence students' explaining skills, emphasizing clarity, structure, and relevance. **Condon et al. (2016),** adopting multiple methods and sources of data, such as surveys, interviews, and classroom observations, reveal that faculty development significantly contributes to enhancing student learning outcomes, as well as positively influence faculty teaching practices and attitudes. **Wright (2017, 2018)** presents robust evidence for the positive impact of educational development on both faculty teaching and student learning outcomes, particularly in critical thinking and quantitative reasoning, resulting from faculty participation in teaching development workshops. **Ilie et al. (2020)** conduct a meta-analysis of several studies on instructional development programs for academics and found positive and significant effects of instructional development programs on teaching skills, attitudes, and behaviors, as well as student outcomes. Collecting data through pre and post questionnaires and interviews, **Singh and Mishra (2021)** show a positive impact of faculty development programs on teachers' attitudes, confidence, and competence, **Fabriz et al. (2021)** indicate an improvement in teaching-related self-efficacy, self-concept, and subjective knowledge about teaching and learning, and **Favre et al. (2021)** highlight the transformative effects for participants' beliefs about their teaching and changes to their instructional practices. Based on retrospective analysis of qualitative focus group, **Onyura et al. (2017)** show how FD, in situated institutional contexts, can produce benefits not only at the level of individual changed teaching practices but also, through enhanced participants' engagement, for faculty and their institutions. More recently, **Zhao et al. (2023),** using the Kirkpatrick model, find that the faculty development improves the participants' competence and confidence as instructors.

In exploring the nexus between institutional context and faculty development in higher education, scholars have also highlighted the pivotal role that context plays in shaping effective strategies for educational change and professional growth. **Kezar and Eckel (2002)**'s case study approach emphasizes the importance of culturally responsive change strategies tailored to the unique context of each institution, thus challenging the notion of universal principles governing change initiatives in higher education. **Becher (2010)** focuses on the coherence between context and knowledge, emphasizing four organizational factors which are useful in elevating the quality and relevance of university education: curriculum design, pedagogical methods, assessment practices, and institutional culture. Pointing out the link between teacher motivation and institutional context, **Silander and Stigmar (2010)** identify three ideological perspectives that influence the motivation of faculty members (individual growth, institutional development, and academic tradition), discussing the implications of these perspectives for the design and evaluation of higher education teacher training. In line with the emphasis on context-specific strategies, **Cilliers and Tekian's (2016)** evaluation of faculty development programs find a positive impact of teacher training on teaching practices, with

transfer influenced by motivation, support, feedback, and institutional culture. More recently **Kolomitro et al. (2021)** show that the effectiveness of faculty development often depends upon organizational factors, indicating a need for a deeper appreciation of the role of institutional context and **Reimann and Wilson (2021)** show that there are crucial differences among teaching development programmes according to whether programmes are compulsory, credit-bearing, formally assessed, and located in a teaching or research-focused institutional environment.

3. The Unimore Faculty Development initiatives

The focus of our analysis were the Faculty Development initiatives conducted in a Northern Italian university - the University of Modena and Reggio Emilia (Unimore) - during the 2022/2023 academic year. These initiatives consisted of a series of seminars and workshops focused on the implementation of inclusive and innovative teaching and learning environments which covered a wide spectrum of topics, including educational tools to address learning barriers, innovative and inclusive teaching methodologies, interactivity enhancement, and the use of digital technologies in teaching. These training opportunities were extended to professors at all career stages, young researchers, doctoral students, administrative staff, community members and teachers from other educational institutions. A complete overview of the faculty development initiatives is given in Table 1. A total of 26 events ranging from 2 to 4 hours in duration were organised in the period between July 2022 and May 2023. While the training sessions were primarily conducted face-to-face to foster interaction, in some cases they also consisted of remote (online) workshops/seminars. In total, 151 participants attended these events, collectively contributing to 448 attendances, with some participants attending more than one event.

Table 1 – Synoptic overview of Unimore Faculty Development initiatives (July 2022 - May 2023)

DATE	TITLE	N°	TYPE	DURATION
07/07/2022	Workshop on Team-Based Learning (TBL)	23	In-person workshop	4h
15/07/2022	In your shoes - Beyond the comfort zone	22	In-person workshop	4h
20/07/2022	For an inclusive university: Case studies	15	Online workshop	3h
25/07/2022	Team-Based Learning and Inclusion	27	Online workshop	3h
28/07/2022	Integrating students with intellectual disabilities at the university	8	Online workshop	2h
14/09/2022	Course for new hires	35	In-person course	

15/09/2022	Course for new hires	31	In-person course	
19-26-27 Sept. 2022: Course on Team-Based Learning (TBL)				
19/09/2022	Designing the course from the end with back-ward planning	19	In-person workshop	4h
26/09/2022	Constructing situations-problems for Team-Application exercises	17	In-person workshop	4h
27/09/2022	Construct multiple-choice questions for the Readiness Assurance Process (I-RAT and T-RAT) and facilitate learning	12	In-person workshop	4h
17/10/2022	Introduction to Inclusion (ICF and Universal Design for Learning)	16	In-person seminar	3,5h
04/11/2022	How to make a lesson more participatory	28	In-person workshop	4h
28/11/2022	UNIMORE's services for inclusion (DSA and disabilities)	11	In-person seminar	2h
05/12/2022	Case-Based Learning (CBL) to facilitate learning in clinical cases	35	In-person workshop	3,5h
13/12/2022	Course for new hires	22	In-person course	
15/12/2022	How to make teaching inclusive with tools and robots	16	In-person workshop	3,5h
20/12/2022	How to make a lesson more participatory	27	In-person workshop	4h
10/03/2023	For a gendered approach to teaching	29	In-person seminar	3h
11/03/2023	Inclusive teaching for students with ASD: From neuropsychological profiling to compensatory tools and dispensatory measures in academia	2	In-person seminar	3h
18/04/2023	Inclusion and students with visual and hearing disabilities	3	In-person seminar	3h
05/05/2023	University and inclusion - Toward an inclusive educational ecosystem	4	In-person seminar	3h
11/05/2023	Inclusion and students with intellectual disabilities	3	In-person seminar	3h
17/05/2023	Embedding Inclusivity in Academic Practice and Development	16	Mixed-mode seminar	3h
23/05/2023	Gender and education in STEM fields	27	Mixed-mode seminar	3h

Note: Total number of participants = 151; Total attendances = 448; some participants attended multiple events.

4. Methodology

To evaluate the impact of faculty development initiatives listed in Table 1, we adopted Kirkpatrick's evaluation framework, which is a globally recognized tool to evaluate the impact of training and learning programmes (**Kirkpatrick, 1959, 1998, Kirkpatrick and Kirkpatrick, 2016**).

The model is articulated in four different levels of evaluation criteria: 1) *Level 1 – Reaction* (reaction to training, measured by participants' satisfaction, interest and engagement after the learning experience); *Level 2 – Learning* (the degree to which participants have acquired new knowledge, skills and abilities through training); *Level 3 – Behaviour* (changes in participants' behaviour after the training sessions due to the application of what they have learnt)t; *Level 4 – Results* (impact of training activities on the organisation as a whole following the changes in participants' behaviour).

The review of different models and strategies adopted in different studies helped us in planning evaluation strategies and, in line with the reference literature, we evaluated the impact of training sessions on the basis of a questionnaire that was submitted to all participants of training events. In particular, the evaluation was performed through a follow-up questionnaire submitted after a short/medium period following the completion of the programme. Our focus on short/medium term impact was explicitly chosen by taking into account that the follow-up evaluation makes staff development activities more worthwhile for everyone (Pulist, 2017), thus potentially increasing knowledge retention and knowledge transfer into the workplace.

4.1 Research questions

Our main research questions were the following: What was the overall impact of Unimore faculty development initiatives on participants? Did they appreciate the seminars/workshops? Did they learn something new about inclusive and innovative teaching practices? Did they change their behaviour/mindset after the training sessions? Were there any effects of the faculty development initiatives on the workplace? The research questions were explicitly aligned with the Kirkpatrick's evaluation criteria and can be further specified as follows.

• *What was the overall impact of Unimore FD initiatives on participants?*

This research question aims at capturing the overall impact of FD initiatives on participants, jointly considering all Kirkpatrick evaluation levels. We then separately analysed each different evaluation level of the Kirkpatrick model as follows.

• *Level 1: Did the participants appreciate the seminars/workshops?*

This research question aims at investigating the extent to which participants appreciated the seminars and workshops. This assessment was pivotal in gauging participants' satisfaction with and

commitment to the FD initiatives, providing valuable insights into how well the program met their expectations and needs.

• *Level 2: Did the participants learn something new from the seminars/workshops?*

This research question aims at investigating whether participants gained new knowledge and skills as a result of their engagement with these seminars and workshops

• *Level 3: Did the participants change their behaviour/mindset after the training sessions?*

This research question aims at investigating whether there were discernible changes in participants' behaviour and mindset following their participation in the training sessions. Our objective was to delve beyond the mere acquisition of knowledge and unearth tangible changes and external outcomes that might be attributed to these initiatives.

• *Level 4: Were there any effects of the FD initiatives on the workplace?*

This research question aims at investigating how these initiatives ripple through the organisation as a whole, extending our analysis beyond individual participants.

To sum up, our research questions were meticulously structured to provide a comprehensive evaluation of the effectiveness of Unimore faculty development initiatives, yielding a holistic understanding of their impact across different levels of assessment.

4.2 Questionnaire

The questionnaire we submitted was in the form of a self-assessment structured questionnaire sent by email to all those who took part in the initiatives in a period ranging from two months to one year after their attendance at the events. The response to the questionnaire was on a voluntary basis. Two reminders of the questionnaire were sent before the deadline and in each reminder we specified the response rate we had obtained up to that point in time. The questionnaire was designed and structured according to Kirkpatrick's evaluation model and was integrated with additional questions from the survey written by AsdUni (Italian Association for the Promotion and Development of Didactics, Learning and Teaching in University https://asduni.it/, Clerici and Paccagnella, 2020, Felisatti and Clerici, 2020), to test for differences in some key teaching mindsets/habits before and after taking part in the FD initiatives. The FD Programme is consistent with the Unimore teachers' training needs as resulted from the AsdUni survey that reached about 500 academic staff (out of a total of about 1,400). The response rate of the survey was similar to that achieved in other universities in Italy, though in Unimore full and associate professors are the most represented in the sample with regards to researchers. The majority of the surveyed teachers employs traditional frontal method of teaching, matched with case studies (38%), work in small groups (32%) and audio and/or video recordings of

lectures (46%) and Problem based learning (32%). The innovative practices that they plan to introduce in their courses concern improving strategies for involving students in the classroom (74% of respondents) followed by the use of collaborative and interactive teaching strategies (45% of respondents) and by the use of technology for teaching (35% of respondents). Unimore academic staff are interested in attending training courses to improve their teaching: in a range of 1=completely disagree to 5= agree, 56% had a score of more than 4, and to be part of a community of practice (61% replies more than 4). The FD training programme was designed to cover the needs expressed by teachers in the AsdUni survey with a special emphasis on inclusive strategies in compliance with Unimore Strategic Plan Objectives.

The questionnaire was explicitly constructed with questions aimed at capturing the four levels of evaluation criteria of Kirkpatrick's model. For each level, we created a group of a minimum of five questions, following the guidelines we found in the related literature on training evaluation and adapting our questions to the institutional context we were focusing on. The answers were proposed according to a Likert scale ranging from 1 ("*Completely disagree"*) to 5 (*"Completely agree"*).

4.3 Dependent variables and covariates

To evaluate the impact of Unimore FD initiatives on participants, we constructed four variables (*Level 1*, *Level 2*, *Level 3*, *Level 4*) consisting of the aggregation of different sub-indices reflecting participants' answers to four groups of questions organised according to Kirkpatrick's four evaluation criteria. All the answers were homogenised in direction and scale (if different). The variables have a high internal consistency (as measured by their Cronbach's alpha), indicating that the questions were appropriately organised. We also constructed an additional variable (*Kirkpatrick*) aggregating all the preceding variables (*Level 1*, *Level 2*, *Level 3*, *Level 4*).

Our main dependent variables are the following:

- **Level 1 – Reaction**: Dependent variable consisting of the aggregation of six items (Cronbach's alpha = 0.91). The aggregate item was formed with sub-indices reflecting participants' perspectives about the event, including items such as: *The topics presented were in line with what I expected from the meeting; I found the meeting topic related to my work/professional needs; The teachers stimulated my interest in further exploring these topics: I would recommend a colleague of mine to participate in these training days*); etc.
- **Level 2 – Learning**: Dependent variable consisting of the aggregation of six items (Cronbach's alpha = 0.74). The aggregate item includes dimensions related to the subjective feeling of learning of the participant using items such as: *The seminar/workshop enabled me*

to improve my level of knowledge with respect to the topic; I learned new notions and acquired new ideas; I was already aware of much of the information received (R); etc.

- **Level 3 – Behaviour**: Dependent variable consisting of the aggregation of five items (Cronbach's alpha = 0.73). This indicator analyses participants' behaviour by examining aspects such as whether the faculty members had had the opportunity to apply the concepts learned or would introduce them or whether they had noticed that they had made changes (of any magnitude) in their behaviour or teaching habits. It includes items such as: *After the training received, I had the opportunity to apply the notions learned in the seminars/workshops in my lessons/training interventions*); etc.

- **Level 4 – Results**: Dependent variable consisting of the aggregation of five items (Cronbach's alpha = 0.79). This indicator aggregates items concerning the observed changes in participants' classes and the feeling of being able to share what they learned with the faculty community. It includes items such as: *In retrospect, how would you rate the impact of the training you received on your classroom? Do I consider myself capable of creating synergies and collaborating with other teachers and/or professionals to design courses or training interventions that consider the specific educational needs of all students?* etc.
- **Kirkpatrick**: Dependent variable consisting of the aggregation of all the preceding variables (Level 1, Level 2, Level 3, Level 4).

Additional dependent variables are related to a number of items previously submitted to all Unimore population through the AsdUni (Italian Association for the Promotion and Development of Didactics, Learning and Teaching in University https://asduni.it/, Clerici and Paccagnella, 2020, Felisatti and Clerici, 2020) questionnaire, and in particular those questions which investigate the teaching methodologies employed and the teachers' evaluation with respect to the following sentences:

- Active teaching methods (group work, labs, exercises, etc.) stimulate learning much more than traditional lectures (*Active Learning*).
- Learning is a process that involves students not only as individuals but also in interaction with other students (collaborative study and sharing) (*Collaborative Education*).
- The use of advanced technologies (e-learning platforms in all their functions, mobile learning, etc.) in education promotes student learning by engaging and motivating them.
- Tailored Teaching: It is appropriate to customise teaching based on the educational needs of each student (*Technology-Enhanced Learning*).
- Having access to expert educational consultants to refer to would be useful *(Educational Guidance Assistance*).

- I feel I need methodological support to properly integrate advanced technologies (e-learning platforms in all their functions, mobile learning, etc.) into my teaching (*Tech Integration Assistance*).

Covariates of interest are demographic and work-related information of participants. The former includes gender and age (aggregate in classes), while the latter includes:

1. Affiliation: a dummy variable which identifies if the participant belongs to the University of Modena e Reggio Emilia (*Unimore* = 1 if the participant belongs to Unimore).
2. Job role/position: a job role/position variable categorized into five classes which are respectively: *PhD/Tutor/Administrative staff*, *Postdoc/Researcher*, *Secondary school teacher*, *Associate professor* and *Full professor.*
3. Department of affiliation: 13 departments were aggregated into six different categories according to the educational field they belong to, namely: *Medicine*; *Economics*; *Humanities* (Humanities, Language and Cultural Studies, Education, Law); *Engineering*; *Sciences* (Physical, Computer and Mathematical Sciences); *Other.*
4. Years of job experience/teaching experience: years of job experience and tenure of a post as a university professor (aggregated in 3 classes), in particular: how many years he/she has worked as a university professor (*Y_Teach*), how long he/she has been in his/her current position (*Y_Role*) and how long he/she has been a part of Unimore (*Y_Unimore*).
5. Roles of responsibility in the University and/ or in the departments: *Roles in University bodies* and *Other academic roles*.

An additional variable (*Passion*) has been included to assess the professors' enthusiasm and passion for teaching. Moreover, the questionnaire also includes information about attendance at the various events. This information consists of two key components: the presence at each event and the overall attendance. The former consists of 23 dummy variables, each set to 1 if the individuals attended a specific event. Overall attendance instead is the individual sum of the events in which participants were present. Finally, the analysis has been integrated with administrative data generated during the events, including details such as the topics covered in the events, dates, event duration, the number of participants, and the modality of participation (in person/online), as illustrated in Table 1.

4. Data and identification strategy

To construct our reference sample, we firstly identified all participants at Unimore FD initiatives who had attended at least one event/seminar (seminar frequencies ≥1). We used administrative data generated during the event registration to identify this population. The total number of participants

that we identified were 151. Of these, 77 responded to our questionnaire, contributing to an overall response rate of 51%.

Details about the response rate of our sample are displayed in Table 2. The table shows a comprehensive overview of response rates among the various categories of participants, where the response rates (column E) were calculated using the following formula: Response rate (%) = 1 - [((A-C))/A], a standard approach for measuring response rates. For participants affiliated with Unimore (University of Modena and Reggio Emilia), the response rate ranged from 34% to 70%. In particular, postdocs/researchers had the highest response rate of 70%, followed by administrative staff participants with 60%. Unimore professors had a response rate of 34%, while other participants had a response rate of 67%. Among non-Unimore participants, both teachers other participants had relatively high response rates of 100% and 60%, respectively.

Table 2 – Questionnaire response rate according to job role/position

	Participants		Respondents		Response rate
	(A) Obs	(B) %	(C) Obs	(D) %	(E)
Total number	**151**		**77**		51%
Unimore	**141**	0.93	**69**	0.90	**49%**
PhD/Tutor	14	0.09	6	0.08	43%
Administrative staff	10	0.07	6	0.08	60%
Postdoc/Researcher	46	0.30	32	0,42	70%
Professor	68	0.45	23	0,30	34%
Other	3	0.02	2	0.03	67%
Not Unimore	**10**	0.07	**8**	0.10	**80%**
Professors	5	0.03	5	0.06	100%
Other	5	0.03	3	0.04	60%

Notes: Percentages (columns B and D) are computed on the total number of participants or respondents (columns A and C). The response rate is computed as $1 - \left[\frac{(A-C)}{A}\right]$.

Overall, the response rates for most categories of participants was good, ranging from acceptable to excellent. These figures can be considered significant in a web-based survey like the one we performed, especially taking into account that response representativeness is more important than response rate in survey research (**Cook et al., 2000**). Moreover, we have to consider that there are different relevant causes that may impede our observation of high faculty participation rates in in-service training activities, such as time constraints (**Cook and Steinert, 2013**) and the pressure to balance multiple roles in the academic work (i.e. research, teaching, administrative duties, thesis mentoring, etc.) (Phuong et al., 2015).

To compose our reference sample, because the evaluation design aimed to assess the impact of training, all participants who did not have teaching hours (e.g. coming from other institutions or the

community) were excluded from the sample of 77 respondents. As a result of these criteria and exclusions, the final sample size for our evaluation included 70 participants.

In principle, the representativeness of our reference sample could be assessed against two distinct reference populations:

1. Population 1: All Unimore staff, i.e. all individuals who are part of the University of Modena and Reggio Emilia (Unimore).
2. Population 2: All participants in the faculty development seminars/workshops, i.e. Unimore staff who actually participated in the training seminars.

Since our primary objective is to measure the impact of FD training activities, we focused our assessment on representativeness on Population 2. Indeed, the study of Population 1 would only make sense when compared with that of Population 2 to offer policy directions on take-up (participation) and our reference sample of 70 respondents only makes sense when compared with the target population of the research (Population 2).

Table 3 displays the summary statistics for our reference sample. Panel A shows the information for all 70 respondents while Panel B contains some extra information available only for university professors. These variables cover a wide range of items, including individual evaluations according to the Kirkpatrick model, information about working positions and the participants' demographics.

The table shows that overall satisfaction (*Kirkpatrick*) is on average 3.71 (out of a maximum of 5), with *Level 1* receiving the highest rating of 4.32, and *Level 4* scoring the lowest level at 3.24. Attendances were very varied, with a mean of 2.7 and a high standard deviation (2.83), indicating significant variability in participation which is mainly due to the heterogeneity in participants' attendance, with a polarisation between some individuals who participated frequently and systematically and others who only participated in one or two different events.

As with the previous table (Table 2), almost all of the sample is composed of Unimore staff, excluding five secondary school teachers. Age distribution is diverse, with the most prominent age group being attendees of 30 to 45 years old. As regards the job role/academic position, the "Postdoc/researcher" role was the most common title among participants, which is consistent with the sample average age. The gender variable suggests a fairly balanced gender distribution, with a slight majority of females. For associate and full professors, the additional data available show that 74% of professors have other academic duties and 39% cover roles of responsibilities in university bodies. They are almost equally distributed in the years of teaching and in Unimore, but 74% of them have been in their current roles for less than 15 years.

Table 3 - Descriptive Statistics

PANEL A – The reference sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Kirkpatrick	70	3.71	.59	1.14	4.83
Level 1	70	4.34	.74	1.5	5
Level 2	70	3.75	.68	1	4.67
Level 3	70	3.29	.8	1	5
Level 4	70	3.24	.81	1	4.8
Attendance	70	2.7	2.83	1	16
Unimore	70	.93	.26	0	1
Age					
20 - 30	70	.06	.23	0	1
30 - 45	70	.47	.5	0	1
46 - 60	70	.37	.49	0	1
61 - 70	70	.10	.3	0	1
Gender					
Male	70	.43	.5	0	1
Female	70	.54	.5	0	1
Non-Disclosed	70	.03	.17	0	1
Position					
Phd/Tutor/Admin. staff	70	.14	.35	0	1
Postdoc/researcher	70	.46	.5	0	1
Secondary school teacher	70	.07	.26	0	1
Associate professor	70	.24	.43	0	1
Full professor	70	.09	.28	0	1
Part-time professor	70	.24	.43	0	1
Departments					
Medicine	70	.1	.3	0	1
Sciences	70	.29	.46	0	1
Economics	70	.16	.37	0	1
Humanities + Other	70	.1	.3	0	1
Engineering	70	.29	.46	0	1

PANEL B – Extra information available only for associate and full professors

Variable	Obs	Mean	Std. Dev.	Min	Max
Roles in University bodies[1]	23	.39	.50	0	1
Other academic roles[2]	23	.74	.45	0	1
Y Teach					
0-14	23	.30	.47	0	1
15-29	23	.39	.5	0	1
30-45	23	.30	.47	0	1
Y Unimore					
0-14	23	.39	.5	0	1
15-29	23	.26	.45	0	1
30-45	23	.35	.49	0	1
Y Role					
0-14	23	.74	.45	0	1
15-29	23	.22	.42	0	1
30-45	23	.04	.21	0	1

Notes:

[1] During the academic year 2022/23, did you hold any roles of relevance for the University (i.e. roles in University bodies)? (e.g., Rector, Pro-Rector, Deputy Rector, member of the Academic Senate, member of the Board of Directors, member of the Internal Evaluation Committee, member of the Quality Assurance Unit, Department Chair, Interdepartmental Centre Director, School/Study Programme or Doctorate President/Coordinator, Specialization School Coordinator, Department Quality Manager, Parity Commission, Department Council)

[2] In the academic year 2022/23, did you hold any other academic roles? (e.g., member of competition committees, member of other internal departmental committees, etc.).

5. Results

In this section we present the results of our analysis of the impact of Unimore faculty development initiatives, firstly providing an analysis based on Kirkpatrick's evaluation model by exploiting the results of our end-of-activity questionnaire, and then presenting a pre-post analysis on professors' mindset and teaching habits on the basis of a comparison with the AsdUni questionnaire.

5.1. The impact of faculty development initiatives according to Kirkpatrick's evaluation model

Table 4 provides a comprehensive overview of participant-based and attendance-based ratings across the different levels of Kirkpatrick's model by job role/academic position. Panel A includes single per capita ratings (i.e. each participant has the same weight), whereas in Panel B the participants' rating is weighted by their attendances. In other words, the difference between the columns in Panel A and in Panel B is that the former averages the single opinion of each participant, while the latter weighs each assessment by the number of attendances of the participant. In both panels the first column provides the average participants' attendance by position, while the other columns show the results of the Kirkpatrick model.

The results show that the scores are generally positive and slightly decrease as we move up the Kirkpatrick evaluation levels: the initial levels (Level 1 and 2) capture the most immediate reactions, while the subsequent levels (Level 3 and 4) are additional steps that build upon the earlier ones. These findings align with the timeline of data collection, which primarily focused on the short to medium-term effects of training. The data collection indeed occurred a short/medium period after the training had taken place, but within the same academic year as the training. As a result, the collected data primarily reflects the immediate and intermediate impacts of training, such as those encompassed within the first and second levels of evaluation. It is reasonable to expect that substantial changes in teaching methods and significant effects on the university institution would require a longer time frame for assessment, likely those occurring at least in the academic year following participation in the training activities.

When we adjust the ratings by the attendance rate (Panel B), the overall evaluations remain relatively stable. However, it is interesting to note that when we correct for attendance, the scores for the higher levels are greater than the simple ones (especially for full professors). This indicates that those who participated more frequently also noticed tangible changes in their behaviour and felt higher results in their classes and/or on the institution. It is important to emphasise, though, that we cannot definitively separate the causal effect, since our results could also be due to a spurious correlation between these variables and the participants' determination/motivation in teaching and professional improvement.

Table 4 - Faculty development evaluation according to job role/academic position, weighted by attendance

PANEL A – Per capita weight

	Attendances	Kirkpatrick	Level 1	Level 2	Level 3	Level 4
Phd/Tutor/PTA	2.8	4.02	4.6	4.05	3.58	3.7
	(1.14)	(.35)	(.39)	(.46)	(.72)	(.59)
Postdoc/researcher	2.28	3.77	4.37	3.8	3.42	3.29
	(2.3)	(.51)	(.59)	(.54)	(.78)	(.73)
Associate professor	2.82	3.58	4.39	3.7	30	2.85
	(3.07)	(.42)	(.51)	(.68)	(.60)	(.88)
Full professor	2.67	3.09	3.72	3.17	2.53	2.79
	(2.58)	(1.09)	(1.39)	(1.16)	(1.18)	(1.04)
Secondary school teach.	4.8	3.87	4.13	3.73	3.76	3.8
	(6.38)	(.71)	(1.45)	(.93)	(.26)	(.20)

PANEL B – Attendance weight

	Kirkpatrick	Level 1	Level 2	Level 3	Level 4
Phd/Tutor/Admin. staff	4.03	4.58	4.08	3.61	3.68
	(0.32)	(0.39)	(0.40)	(0.70)	(0.52)
Postdoc/researcher	3.86	4.38	4.00	3.41	3.51
	(0.51)	(0.61)	(0.56)	(0.75)	(0.69)
Associate professor	3.72	4.48	3.91	3.21	3.03
	(3.32)	(3.58)	(3.32)	(3.14)	(3.27)
Full professor	3.32	3.58	3.32	3.14	3.27
	(3.71)	(4.16)	(3.78)	(3.39)	(3.42)
Secondary school teacher	3.16	2.74	2.81	3.62	3.70
	(0.74)	(1.56)	(0.94)	(0.17)	(0.17)

Notes: The answers were proposed according to a Likert scale ranging from 1 ("*Completely disagree"*) to 5 (*"Completely agree"*): 1= Strongly disagree; 2= Disagree; 3= Mixed Opinion; 4= Agree; 5=Strongly Agree / Standard deviation in parenthesis.

Table 5 shows the correlations between Kirkpatrick's evaluation scores and personal characteristics. Demographic characteristics (gender and age) do not seem to have any significant relationship with Kirkpatrick's ratings (overall and for each level). However, the academic position matters: Ph.D. students/tutors/administrative staff perceive themselves as having a more significant impact on their institutions as a result of the training activities (Level 4). In contrast, the overall satisfaction (Level 1), learning (Level 2), and behaviour (Level 3) exhibit negative correlations with those of full professor status.

Table 5 - Faculty Development evaluation and personal characteristics

	(1) Kirkpatrick	(2) Level 1	(3) Level 2	(4) Level 3	(5) Level 4
Male	-0.05	-0.01	-0.02	-0.04	-0.08
Age	-0.17	-0.20	-0.21	-0.03	-0.08
PhD/Academic staff	0.22	0.12	0.19	0.15	0.26*
Postdoc researcher	0.09	0.06	0.06	0.15	0.03
Secondary school teacher	0.08	-0.08	-0.01	0.16	0.19
Associate professor	-0.13	0.04	-0.05	-0.21	-0.27*
Full professor	-0.32**	-0.26*	-0.27*	-0.29*	-0.17
Roles in university bodies	-0.14	-0.11	-0.05	-0.21	-0.07
Other academic roles	-0.22	-0.02	-0.19	-0.28*	-0.28*
Part-time professor	-0.13	-0.10	-0.11	-0.07	-0.13
Y_teach	-0.35**	-0.18	-0.25*	-0.34**	-0.35**
Passion	0.81***	0.72***	0.72***	0.63***	0.34**

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ / The variable *Passion* assesses the professors' enthusiasm and passion for teaching.

We also see a negative relationship between the outcomes of the Kirkpatrick model and full professors or teachers with many years of teaching experience. This is expected and could be due to several reasons. First, their body of knowledge is certainly more developed and leaves less room for learning, and this may also result in less flexibility and openness to new teaching practices. Moreover, given the stage of their career, they may have less need of them. We also hypothesize that the duration of in-service training sessions (up to 4 hours) may have clashed with their typical busy schedule and/or with their academic engagements.

Finally, an interesting result is the positive and strong relationship between the passion that participants have for teaching and their ratings (as a whole and alongside all levels).

5.2 . Pre-post analysis on teaching strategies and mindsets

To evaluate the impact of faculty development initiatives on changes in mindset/teaching habits, our faculty development questionnaire was integrated with additional questions from the AsdUni questionnaire which was submitted to all at the University before the training seminars started. The goal was to perform a pre-post analysis to test for differences in some key teaching mindsets/ habits before and after the training.

Tables 6 and 7 are dedicated to this pre-post analysis. In both tables, column (1) shows the results of the AsdUni university sample (506 observations), column (2) includes the AsdUni Subsample statistically matched with our participants on the basis of the specific personal attributes (i.e. Department of Affiliation, Age, Role, Scientific Disciplinary Sector (SSD) and Gender) and column (3) shows the subsample of our 70 participants which match with the AsdUni respondents. Regarding the latter, it is important to highlight that it was not possible to match all participants because the AsdUni questionnaire wasn't submitted to PhD students or academic staff, and only structured

research fellows, and even very few of those. Column (4) shows the difference between columns (1) and (2), and column (5) the differences between columns (2) and (3). In other words, column (4) offers an overview of the differences in pre-replies between the whole population and the subsample matched, while column (5) shows the changes after seminar participation.

The respondents' agreement with some sentences related to teaching activity are presented in Table 6. The t-test in column (4) shows that the matched subgroup does not differ significantly from the entire population: the only two statements in which the counterfactual has the lowest score are unexpectedly the view that active teaching methods stimulate learning much more than traditional lectures and that it is appropriate to customize teaching based on the educational needs of each student. Column (5) shows that the participants' perspectives improved in all key areas post-intervention. Together with these, however, there is also the awareness of the need for further training and, above all, technical support to put what has been learnt into practice.

Table 6 – Pre-post analysis on professors' mindsets and teaching strategies

	(1) ASDUNI		(2) ASDUNI COUNTERFACT.		(3) OUR MATCHED SAMPLE		(4) T-TEST		(5) T-TEST	
	mean	sd	mean	sd	mean	sd	b	t	b	t
Active Learning	4.14	0.93	3.90	0.95	4.24	0.76	-0.27*	(-2.26)	0.34*	(2.03)
Collaborative Education	4.21	0.84	4.06	0.94	4.46	0.61	-0.17	-(1.48)	0.40**	(2.70)
Technology-Enhanced Learning	3.58	1.01	3.44	1.01	4.00	0.82	-0.16	(-1.27)	0.56**	(3.13)
Tailored Teaching	3.63	1.04	3.39	1.06	3.62	0.83	-0.28*	(-2.07)	0.23	(1.22)
Educational Guidance Assistance	3.21	1.30	3.32	1.21	4.08	0.89	0.13	(0.81)	0.76***	(3.69)
Tech Integration Assistance	2.84	1.26	2.79	1.25	3.84	0.93	-0.07	(-0.42)	1.05***	(4.93)
N	506		71		37		506		108	

Notes: Column (1) shows results of the AsdUni questionnaire. Column (2) includes the Asduni Subsample statistically matched with our participants on the basis of the following personal attributes: Department of Affiliation, Age, Role, Scientific Disciplinary Sector (SSD) and Gender. Column (3) shows the results of our matched sample, Column (4): T-test (1) vs (2) =participants' representativeness of Unimore population / Column (5): T-test (2) (3) = pre-post differences. *Active Learning:* Active teaching methods (group work, labs, exercises, etc.) stimulate learning much more than traditional lectures/*Collaborative Education*: Learning is a process that involves students not only as individuals but also in interaction with other students (collaborative study and sharing) / *Technology-Enhanced Learning:* The use of advanced technologies (e-learning platforms in all their functions, mobile learning, etc.) in education promotes student learning by engaging and motivating them / *Tailored Teaching*: It is appropriate to customise teaching based on the educational needs of each student / *Educational Guidance Assistance:* Having access to expert educational consultants to refer to would be useful / *Tech Integration Assistance:* I feel I need methodological support to properly integrate advanced technologies (e-learning platforms in all their functions, mobile learning, etc.) into teaching.

Table 7 compares the most common teaching strategies adopted in Unimore before the training and those that can potentially be adopted after training. The relevant questions were: (a) What teaching strategy (or strategies) do you usually use? (AsdUni questionnaire) / (b) What teaching strategy (or strategies) do you intend to use in the upcoming lessons? (our questionnaire). Teachers could choose

multiple answers from the above choices, so they are not mutually exclusive, but each percentage can range from 0 to 100.

We observed that 100% of participants used frontal lectures before the training, in contrast to 97% of all university respondents. This difference is statistically significant and aligns with the findings in the preceding table. However, after the training, there was a substantial decrease in the percentage of respondents who prefer to adopt frontal lectures as a unique teaching strategy, which is explained by a shift towards the increase in the use of small group work, team-based learning, and frontal lectures with survey tools. These three teaching methodologies are also the ones targeted the most by the training seminars as shown by the synoptic overview in Table 1. The findings also show that the willingness to record lessons has decreased: this result is in line with the finding that activities involving interaction are not well suitable to be recorded. The negative coefficient concerning the use of lecture recording is in line with the fact that, if the chosen new teaching methods are working in small groups/teams or in general interactive teaching, there is less incentive and/or possibility to record the lectures. Finally, we notice an increased awareness of the need for more support in both the technical and content aspects of didactic innovation.[4]

Table 7 – Pre-post analysis of adopted teaching strategies

	(a)				(b)					
	(1)		(2)		(3)		(4)		(5)	
	ASDUNI		ASDUNI COUNTERFACT.		OUR MATCHED SAMPLE		T-TEST		T-TEST	
	mean	sd	mean	b	t	b	b	t	b	t
A. Frontal lecture	0.97	0.16	1.00	0.00	0.68	0.47	0.03***	(3.66)	-0.32***	(-4.16)
B. Front. lect. with survey tools	0.08	0.27	0.04	0.20	0.38	0.49	-0.04	(-1.56)	0.34***	(3.99)
C. Flipped classroom	0.06	0.23	0.06	0.23	0.11	0.31	0.00	(0.04)	0.05	(0.88)
D. Case studies	0.38	0.49	0.35	0.48	0.41	0.50	-0.04	(-0.59)	0.05	(0.53)
E. Role playing	0.05	0.21	0.01	0.12	0.05	0.23	-0.04*	(-2.19)	0.04	(0.99)
F. Simulation	0.15	0.36	0.06	0.23	0.05	0.23	-0.11***	(-3.45)	-0.00	(-0.05)
G. Debate	0.12	0.32	0.08	0.28	0.11	0.31	-0.04	(-1.08)	0.02	(0.38)
H. Cooperative learning	0.07	0.25	0.06	0.23	0.05	0.23	-0.01	(-0.49)	-0.00	(-0.05)
I. Work in small groups	0.32	0.47	0.28	0.45	0.51	0.51	-0.05	(-0.85)	0.23*	(2.34)
J. Learning with peers	0.05	0.22	0.03	0.17	0.08	0.28	-0.03	(-1.29)	0.05	(1.07)
K. Team-based Learning	0.05	0.21	0.06	0.23	0.24	0.43	0.01	(0.35)	0.19*	(2.44)

[4] **Belt and Lowenthal (2020)** conduct a literature review on faculty development to identify some best practices on how to increase teaching with technology in higher education and emphasize the effectiveness of mentorship and faculty-teaching-faculty interactions, the growing significance of online delivery methods, and the need for cross-disciplinary collaboration. **Kostolányová et al. (2022)** underscore the positive outcomes achievable through targeted faculty development in integrating technology and innovative teaching methodologies.

L. Problem-Based Learning	0.20	0.40	0.17	0.38	0.16	0.37	-0.04	(-0.78)	-0.01	(-0.09)
M. Project-based learning	0.10	0.30	0.07	0.26	0.05	0.23	-0.03	(-0.97)	-0.02	(-0.34)
N. Challenge based learning	0.03	0.16	0.01	0.12	0.08	0.28	-0.01	(-0.84)	0.07	(1.41)
O. Concept/mind Maps	0.08	0.27	0.03	0.17	0.08	0.28	-0.06*	(-2.47)	0.05	(1.07)
P. Lecture recording	0.46	0.50	0.45	0.50	0.24	0.43	-0.02	(-0.25)	-0.21*	(-2.23)
Q. Podcasts	0.02	0.14	0.03	0.17	0.00	0.00	0.01	(0.47)	-0.03	(-1.42)
Observations	506		71		37		506		108	

Notes: Column (1) shows results of the AsdUni questionnaire. Column (2) includes the Asduni Subsample statistically matched with our participants on the following personal attributes: Department of Affiliation, Age, Role, Scientific Disciplinary Sector (SSD) and Gender. Column (3) shows the results of our matched sample, Column (4): T-test (1) vs (2) =participants' representativeness of Unimore population / Column (5): T-test (2) (3) = pre-post differences.
Professors could choose multiple answers from the above choices, so they are not mutually exclusive, but each percentage can range from 0 to 100. The questions were: What teaching strategy (or strategies) do you usually use? (AsdUni questionnaire) / What teaching strategy (or strategies) do you intend to use in the upcoming lessons? (our questionnaire)

To sum up, our pre-post analysis indicates that the participants showed changes in both their teaching perceptions and the teaching methodologies they intend to apply: this result is consistent and in line with the topics of the seminars they participated in.

6. Conclusions

In this paper we have evaluated the impact of faculty development initiatives implemented in an Italian university (University of Modena and Reggio Emilia) during the 2022/2023 academic year. The programme consisted of a series of lectures and workshops focused on the implementation of innovative and inclusive teaching practices for university professors and teaching staff. In line with the reference literature, we have performed our analysis on the basis of the Kirkpatrick model of training evaluation, a standard tool for implementing the evaluation of training programmes.

Our results show a positive impact of training on university teachers according to the different evaluation criteria considered, with differences emerging according to the job position/role of the teaching staff and according to the evaluation criteria. In particular, we find that the highest values resulted from the first and second levels of evaluation (Reaction and Learning, i.e. reaction to training measured by participants' satisfaction and the degree to which participants have acquired new knowledge), while lower values resulted from the third and fourth levels of evaluation (Behaviour and Results, i.e. changes in participants' behaviour and impact of training activities on the organisation as a whole). These results are consistent with the timeline in which the data collection was performed: since the data collection was only performed a short/medium period after the training (i.e. within the same academic year as the training was performed), it captured mostly short/medium-term effects of training like those included in the first and the second level of evaluation. Indeed, it is reasonable to expect that changes in teaching behaviour and sizeable impacts on the university

institution will only be measurable after a medium/long term after the training, i.e. at the earliest in the academic year following the participation in the training activities. Our findings also show that there have been changes in adopted teaching methodologies and professors' mindset between pre and post training activities: this result is consistent and in line with the topics of the seminars they participated in.

The results obtained underscore the presence of a strong potential for faculty training activities, but it is not fully exploited within the university community. The need to investigate more deeply into the reasons that have hindered greater participation in the training activities and to develop strategies for addressing these issues is suggested to unlock the full potential of the training project and ensure that it effectively meets the needs of the entire University staff.

We therefore hypothesize that the duration of training sessions (up to 4 hours) during lesson times often clashes with scheduling conflicts and/or time constraints with professors' academic commitments. One suggestion would be to make training materials available asynchronously in the form of recordings. This would undoubtedly increase the coverage rate, but it faces the risk of losing the quality and the impact created by face-to-face interactions. One strategy we adopted starting from the second semester (spring 2023) is to combine both approaches: maintain an in-person training programme with the scheduled length (for greater effectiveness) and make recordings available later asynchronously ex-post (for a greater coverage rate).

In conclusion, this research underscores the importance of FD programmes and university teacher training not only for the construction of innovative and inclusive learning environments, but also for the enhancement of a more efficient, high-quality (and therefore more competitive) educational system. The results obtained in our analysis can be leveraged to improve future training initiatives in higher educational systems with the final goal of facilitating the full participation and realisation of university student potential.

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